**Guru Nanak Dev Engg. College, Ludhiana**

**Deptt. Of Applied Sciences**

**Revised Syllabus (For New Batch 2014 Admissions)**

**Subject : Engineering Physics**

**Subject Code: BTPH-101**

**Paper Id: ABTPH-101**

## Section-A

1. **EM Waves & Dielectrics:** Physical significance of Gradient, Divergence & Curl, Relationship between Electric Field & Potential, Dielectric polarization, Displacement Current, Maxwell's Equations, Equations of EM waves in free space, velocity of EM waves, Poynting vector.

2. **Magnetic Materials & Superconductivity:** Introduction to magnetic materials, Ferrites, Magnetic Anisotropy, Magnetostriction & its application in production of Ultrasonic waves, Introduction to Superconductivity, Signatures of Superconducting state, Meissner Effect, Type I & Type II Superconductors, London Equations, Introduction to BCS Theory and High Temperature Superconductors.

3. **Elements of Crystal Physics:** Lattice, Basis, Unit Cell, Bravais Lattice, Crystal Systems, Lattice Planes, Miller Indices, Spacing between lattice planes, X ray diffraction, Bragg's Law & its applications in crystallography, Bragg's spectrometer, Crystal Growth (Qualitative Approach).

4. **Lasers:** Spontaneous & Stimulated Emissions, Einstein's Coefficients, Components of laser, Three level & Four level laser systems, He-Ne laser, $CO_2$ laser & its industrial applications, Semiconductor laser, Introduction to Holography (Qualitative Approach).

## Section-B

5. **Fibre Optics:** Introduction to Optical Fibres, Acceptance Angle, Numerical Aperture, Normalized Frequency, SI & GRIN fibres, Single Mode and Multi Mode fibres, Pulse Dispersion (Qualitative Approach), Attenuation through optical fibres, Introduction to Splices, Connectors & Couplers, Fibre Optic Communication System & Sensors (Qualitative Discussion).

6. **Special Theory of Relativity:** Einstein's postulates, Lorentz Transformation Equations, Length Contraction, Time Dilation, Addition of Velocity, Variation of mass with velocity, Mass-Energy & Energy-Momentum relations.

7. **Quantum Theory:** Origin of Quantum Theory, Wave-Particle Duality, Matter Waves, Phase velocity, Group velocity, Uncertainty Principle, Significance & Normalisation of wave function, Eigen Functions & Eigen Values, Time Dependent & Time Independent Schrodinger wave equation, Particle in a box (One Dimensional Case), Introductory Quantum Statistics.

8. **Nanophysics:** Nanoscale, Surface to Volume Ratio, Introduction to Nanoparticles & Nanofluids, Synthesis & Properties of Nanomaterials, Introduction to Carbon Nanotubes, Applications & Potential Risks of Nanomaterials.

**Suggested Books:**


1. Introduction to Electrodynamics, Griffiths D J, Prentice Hall.
2. Material Science & Engg., Raghvan V, Prentice Hall of India.
3. Material Science & Engg., Callister W D, John Wiley & Sons.
4. Solid State Physics, Dan Wei, Cengagae Learning.
5. Introduction to Solids, Azaroff L V, Tata McGraw Hill.
6. Concepts of Modern Physics, Beiser A, Tata McGraw Hill.
7. Concepts of Modern Physics, Mahajan S & Choudhary S R, Tata McGraw Hill.
8. Engineering Physics, Malik H K & Singh A K, Tata McGraw Hill.
9. Lasers & Non-Linear Optics, Laud B B, New Age International Ltd.
10. Laser Theory & Applications, Thyagarajan K & Ghatak A K, McMillan India Ltd.
11. Fibre Optic Communication, Palais J C, Pearson Education.
12. Physics: A calculus based approach (Vol I & II), Serway R A & Jewett J W, Cengage Learning.
13. Physics for Scientists & Engineers (Vol I & II), Serway & Jewett, $6^{th}$ Ed., Cengage Learning.
14. Nanotechnology, Rathi Rakesh, S. Chand & Co.
15. Nanomaterials, Bandyopadhyay A K, New Age International Publishers.

**Guru Nanak Dev Engg. College, Ludhiana**

**Deptt. Of Applied Sciences**

**Revised Syllabus (For New Batch 2014 Admissions)**

**Subject : Engineering Physics Laboratory -BTPH-102**

1. Basic knowledge of least count and error analysis.
2. To find the divergence of given laser.
3. To study diffraction using laser beam and hence determine the grating element.
4. To study laser interference using Michelson's Interferometer and hence find the wavelength of laser light.
5. To determine the numerical aperture of an optical fibre.
6. To determine the attenuation coefficient of a given optical fibre.
7. Introduction to spectrometer and its use to find the angle of prism.
8. To find the refractive index of a liquid.
9. To obtain the waveform of a given oscillator/A.C. Mains using CRO.
10. To study B-H curve using CRO.
11. To find the velocity of ultrasonic waves in a given liquid.
12. To find the dielectric constant and polarisability of a dielectric substance.

**Note: Expt. No. 1 is compulsory. Each student is required to perform at least Eight Experiments from 2-12.**

**Suggested Books:**


1. Practical Physics, Arora C L, S. Chand & Co.
2. Practical Physics, Sirohi R S, Wiley Eastern.